

In re Patent Application of:
MCGETTIGAN ET AL.
Serial No. 10/785,589
Filed: 02/23/2004

Claims

1.(currently amended) An anti-aliasing filter for use in a device including a photodetector array having a plurality of pixels, comprising:

a substrate;

a first double-refraction plate ("DRP") adapted to separate an incoming ray of light into an ordinary ray and an extraordinary ray having different polarization states, of the DRP anti-aliasing filter having at least

a first liquid photo-polymerization ("LPP") layer having an optical axis oriented at an angle non-parallel and non-perpendicular to a surface of the LPP layer, the first LPP layer connected to the substrate, and

a first liquid-crystal polymer ("LCP") layer disposed on the first LPP layer having an optical axis aligned with the orientation of the optical axis of the LPP layer, the orientation comprising an optical axis of the first DRP,

the first DRP having a thickness and an optical axis selected so as to provide a selected separation, d, of ordinary and extraordinary light rays such that d is large enough for the separated ordinary and extraordinary light rays to substantially illuminate two adjacent pixels of the photodetector array.

2.(original) The anti-aliasing filter of claim 1 wherein the first LPP layer is disposed on the substrate.

3.(original) The anti-aliasing filter of claim 1 further comprising an intervening layer disposed between the substrate and the first LPP layer.

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4.(original) The anti-aliasing filter of claim 1 further comprising a second LCP layer disposed on the first LCP layer.

5.(original) The anti-aliasing filter of claim 4 wherein the first LPP layer has a selected orientation and the second LCP layer has the selected orientation.

6.(original) The anti-aliasing filter of claim 1 wherein the thickness is between about 10 microns and about 150 microns.

7.(original) The anti-aliasing filter of claim 1 further comprising:

a first anti-reflective filter disposed on a first surface of the anti-aliasing filter; and

a second anti-reflective filter disposed on a second surface of the anti-aliasing filter.

8.(original) The anti-aliasing filter of claim 7 wherein the second anti-reflective filter is disposed on the first DRP.

9.(original) The anti-aliasing filter of claim 7 wherein the second anti-reflective filter is disposed on a second substrate, the second substrate being affixed to the first DRP.

10.(original) The anti-aliasing filter of claim 9 wherein the second substrate is affixed to the first DRP with optical adhesive so as to provide index matching between the first DRP and the second substrate.

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11. (currently amended) The anti-aliasing filter of claim 1 further comprising:

a retarder plate disposed on the first DRP having an optical axis parallel to the surface of the LPP layer; and
a second DRP disposed on the retarder plate adapted to separate an incoming ray of light into an ordinary ray and an extraordinary ray having different polarization states, the second DRP having at least

a first liquid photo-polymerization ("LPP") layer having an optical axis oriented at an angle non-parallel and non-perpendicular to a surface of the LPP layer, said first LPP layer connected to the retarder plate, and

a first liquid-crystal polymer ("LCP") layer disposed on the first LPP layer having an optical axis aligned with the optical axis of the LPP layer, the orientation comprising an optical axis of the second DRP,

the second DRP having a thickness and an optical axis selected so as to provide a selected separation, d, of ordinary and extraordinary light rays such that d is large enough for the separated ordinary and extraordinary light rays to substantially illuminate two adjacent pixels of the photodetector array.

12. (original) The anti-aliasing filter of claim 11 wherein the retarder plate and the second DRP are selected so as to provide a two-dimensional anti-aliasing filter for at least one color of light.

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13.(original) The anti-aliasing filter of claim 11 wherein the first DRP, the retarder plate and the second DRP are selected so as to provide a one-dimensional anti-aliasing filter for a first color of light and a two-dimensional anti-aliasing filter for a second color of light.

14.(original) The anti-aliasing filter of claim 11 wherein the retarder plate includes a plurality of quarter-wave retarder plates.

15.(original) The anti-aliasing filter of claim 11 wherein the first DRP, the retarder plate, and the second DRP are all made from an LPP material and an LCP material.

16.(original) The anti-aliasing filter of claim 11 wherein the first DRP is made from a first LPP material and a first LCP material, and the retarder plate is made of a second LPP material and one of the first LCP material and a second LCP material.

17.(original) The anti-aliasing filter of claim 11 wherein the substrate is infrared-blocking color glass.

18. (original) The anti-aliasing filter of claim 17 further comprising an infrared-blocking filter.

19.(original) The anti-aliasing filter of claim 11 further comprising an infrared-blocking filter.

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20.(currently amended) The anti-aliasing filter of claim 1
further comprising:

a package for providing environmental security to an
imaging device; and

a photodetector array disposed within the package, the
anti-aliasing filter being disposed on a lid of the package.